C. Claims

The following is a complete listing of the claims, and replaces all earlier versions and listings.

1. (Currently Amended) A ~~chemical~~ sensor device for detecting a reaction of a sensor material with a specimen based on ~~the basis of~~ an intensity of a surface plasmon polariton wave generated by light irradiation and propagated along a surface of a sensor medium, the sensor device ~~comprising the sensor material, said chemical sensor~~ comprising:

the sensor medium comprising a substrate, a metal film having a plurality of openings formed on the substrate, and the sensor material positioned on the metal film for reacting with the specimen,

wherein the openings have a size smaller than a wavelength of the irradiation light and a predetermined pitch that is substantially equal to an integral multiple of a wavelength of the surface plasmon polariton wave, and

wherein the openings include adjacent two openings sandwiching a metal film portion having a length of circumstance, which is a substantially integral multiple of a wavelength of the surface plasmon polariton wave~~wherein said sensor medium comprises a periodic structure and the sensor material disposed on the periodic structure, the periodic structure having a pitch substantially equal to an integral multiple of a wavelength of the surface plasmon polariton wave generated by irradiating an interface between the periodic structure and the sensor material with light~~.

2. (Currently Amended) ~~A sensor~~The sensor device according to Claim 1, wherein the sensor material is a biochemical sensor material.

3-4. (Cancelled)

5. (Currently Amended) The sensor device ~~A sensor~~ according to Claim ~~3~~1, wherein the openings have a slit shape, and their periodic arrangement is a one-dimensional arrangement in a surface of the metal film ~~surface~~.

6. (Cancelled)

7. (Currently Amended) The sensor device ~~A sensor~~ according to Claim ~~3~~1, wherein the periodic structure is provided in a plurality of periodic structures, which have the same or different sizes and/or pitches of their openings and the same or different arrangement directions.

8. (Currently Amended) The sensor device ~~A sensor~~ according to Claim 1, wherein the periodic structure comprises ~~at least one opening provided in a metal film with a predetermined pitch and~~ at least one recess portion or projection portion provided in the metal film~~, the opening having a size which is smaller than a wavelength of~~

~~the irradiation light~~.

9. (Currently Amended) The sensor device ~~A sensor~~ according to Claim 8, wherein the ~~opening~~ openings and the at least one recess portion or the projection portion have a substantially circular shape or a substantially polygonal shape, and their periodic arrangements are ~~a~~ two-dimensional ~~arrangement~~.

10. (Currently Amended) The sensor device ~~A sensor~~ according to Claim 9, wherein the two-dimensional arrangement is such an arrangement that the recess portion or the projection portion is disposed concentrically around ~~the~~ an opening.

11. (Currently Amended) The sensor device ~~A sensor~~ according to Claim 8, wherein the ~~opening~~ openings and the at least one recess portion or the projection portion have a slit shape, and their periodic arrangements are ~~a~~ one-dimensional ~~arrangement~~.

12. (Cancelled)

13. (Currently Amended) The sensor device ~~A sensor~~ according to Claim ~~3~~1, wherein the metal film is a film of a metal or alloy selected from the group consisting of gold, silver, copper, and aluminum.

14-15. (Cancelled)

16. (Currently Amended) The sensor device ~~A sensor~~ according to Claim 1, wherein ~~the sensor medium comprises the periodic structure and a substrate for the sensor material disposed on the periodic structure,~~ the substrate ~~comprising~~ comprises a prism.

17. (Currently Amended) A sensor apparatus, comprising:

a ~~chemical~~ sensor device according to any one of Claim 1~~,~~;

a light source for irradiating the chemical sensor with light~~,~~; and

a photodetector for detecting light transmitted through or reflected from the chemical sensor.

18. (Currently Amended) ~~An~~ The sensor apparatus according to Claim 17, wherein the photodetector comprises a spectroscope.

19. (Currently Amended) ~~An~~ The sensor apparatus according to Claim 18, wherein the photodetector comprises means for detecting light transmitted through a band-pass filter.

20. (Currently Amended) ~~An~~ The sensor apparatus according to Claim 17, wherein the sensor medium is integrally supported in a micro total analysis system prepared through a semiconductor process.

21. (Currently Amended) ~~An~~ The sensor apparatus according to Claim 17, wherein the sensor medium is integrally supported in a DNA chip prepared ~~through~~ by a semiconductor process.

22. (Currently Amended) ~~An~~ The sensor apparatus according to Claim 17, wherein the sensor medium is integrally supported in a protein chip prepared through a semiconductor process.